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March 19, 1960
VOL. 77, NO. 12 PAGES 177-192

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Top Talent

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ROCKETS AND MISSILES

Pioneer V Orbits Sun

AMERICA's new planetoid, now hurtling headlong into its around-the-sun orbit, is a triumph for the U. S. space effort. Here is why:

1. The first and third stages burned to within one second of normal; the second stage burned to within one-tenth of a second of normal. The planetoid thus left the earth's orbit at a speed of 36,480 feet per second, only 120 feet per second slower than the speeds scientists were "shooting at."

2. Guidance was built into both of the first and second stages of the three-stage Thor-Able launcher. The second stage guidance was to be used for tricky corrections in the planetoid's complex sun-going path. But the initial guidance was so accurate that the second stage guidance system was not used.

3. The 94-pound planetoid was successfully balanced to have its center of gravity at the right spot to prevent wobbling in space. To locate this center of gravity at just the right spot, all the instruments had to be carefully arranged inside the beach-ball-sized casing. Even the lengths of wire used in its intricate electric system played a significant role in controlling the planetoid's stability.

4. The planetoid will be talking back, upon command from earth, with what is believed the strongest space-going radio ever launched. The 150-watt transmitter is to operate five minutes out of the hour, resting 55 minutes to recharge its batteries with solar cells.

To broadcast on 378 megacycles, the radio telemetered signals should be received on earth until the planetoid is about 50 million miles away. Scientists at the National Aeronautics and Space Administration say radio contact should be maintained for about 151 days. Radio contact then can cease until the planetoid next comes into broadcasting range of the earth.

The purpose of the new planetoid is to gather new information on the solar corona in an area that has not been "gouged out" by the earth and its magnetic field. Because the planetoid will be circling the sun on a pristine orbit, it should be traveling through a representative sample of "undisturbed" solar corona.

A second purpose of the planetoid is to gather data on high-energy particles in space. By receiving such information from both the new planetoid and earth-circling satellites, scientists can learn more about the movements of such particles as they romp through space.

Pioneer V vital statistics: Launched at Cape Canaveral, Fla., March 11 at sunup so that the rotation of the earth would tend to sling it off into an orbit falling inside that of the earth. Estimated "year" for the planetoid is 311 days. Temperature of its skin may vary hundreds of degrees above and below zero, but instruments inside will be kept at 55 to 80 degrees Fahrenheit due to the way that the skin was painted with black and white paint. Length of its calculated path around the sun is 506 million miles.

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PHYSICS

Krypton Line Makes Meter

A NON-DESTRUCTIBLE standard for the international meter has been proposed and is expected to be accepted by the International Conference on Weights and Measures when it meets in Paris in October.

The new standard will define the meter in terms of the orange-red spectral line of light emitted from excited atoms of krypton 86 (isotope with atomic weight 86). The meter will be 1,650,763.73 times the wavelength of this line.

The suggestion that the meter be based on a wavelength of light is more than 100 years old. Problems delaying its adoption have included finding the most suitable isotope of a usable element and separating a large enough quantity of this isotope for practical use.

At the last meeting of the International Conference on Weights and Measures, in 1954, color lines from four elements were proposed for consideration as a basis for the meter standard: cadmium, krypton 84, xenon 136 and mercury 198. Final judgment was deferred until this year so that physicists from each country could study the pros and cons of the different lines proposed.

Alvin G. McNish of the National Bureau of Standards said that the general consensus now favors krypton 86 because it can be used at a low, stable temperature easily obtained, and the orange-red line is narrow enough that it can be measured accurately.

The present international meter standard is the distance between two scratches marked on a bar made of platinum and iridium, housed at the International Bureau of Weights and Measures in Sevres, France. It is carefully maintained in an air-conditioned vault.

If the bar should be damaged, lost or destroyed, there would be no primary standard. This is one of the reasons that a non-destructible standard is preferred.

With the new wavelength standard, any laboratory that has the proper equipment can reproduce the primary standard. And the length of the meter can be measured more precisely.

However, the meter bar does not become a useless piece of metal. Mr. McNish said that the unit of the meter will not be changed and "we will still have to have meter bars, rulers and metal surveying tapes.

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ASTRONOMY

U. S. Builds Radio-Telescope in Scotland

SECRETS of the aurora borealis, or Northern Lights, are expected to be probed by a radio-telescope built at Hillhead, about four miles west of Fraserburgh, Scotland, and about 40 miles north of Aberdeen.

The equipment is the second largest steerable radio-telescope to be built in Europe—its saucer is 142 feet in diameter, against Jodrell Bank's 240 feet. It cost $225,000 to erect, provided by the U. S., through the Stanford Research Institute of California, under a grant from the U. S. Air Force.

The new telescope was built to perform one specific job, and that is expected to be completed in about 12 months. It is "to bounce radio waves off the aurora borealis," to increase our understanding of the Northern Lights and contribute to our knowledge of the ionosphere.

Scientists from Stanford will be operating this telescope, and they will be assisted by a small team from the Royal Radar establishment of the Ministry of Aviation. The Ministry is also providing various other forms of technical assistance and facilities.

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ZOOLOGY

Robins Risk Death Flying Into DDT Areas

WHEN ROBINS nest in the spring they will be menaced where DDT sprays are used to check Dutch elm disease.

Prof. Joseph J. Hickey of the University of Wisconsin department of forestry and wildlife management, and L. Barrie Hunt, a graduate student, have found that a DDT sprayed community is "a trap for birds that migrate into it to nest each year."

Last April through June 69% to 98% fewer nesting robins were found in areas sprayed with DDT for control of Dutch elm disease than in unsprayed areas checked for comparison.

The report states that mist blowing as well as hydraulic spraying resulted in bird mortality, and that while spraying during the trees' dormant season might spare May migrants, it "nevertheless takes a heavy toll of other bird life."

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TECHNOLOGY

USSR Develops Glass of Exceptional Strength

RUSSIAN workers at the experimental department of the factory Avtosteklo (Autoglass) have developed a strong new material, glassporcelain. It is made from glass by a special heat treatment. This material is intended for manufacturing insulators, window sills, stair steps, and tiles for floors and pipes.

The glassporcelain has very high bending strength, and is resistant to temperatures up to 572 degrees Fahrenheit.

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ASTRONOMY

Comet to Be Seen in April

Comet Burnham, discovered Dec. 30 last year, will be visible to the eye under good seeing conditions most of April. The comet is moving from south to north toward the North Star.

COMET BURNHAM, discovered Dec. 30, 1959, at a time when it could not be seen directly, will wag its tail at the North Star in April and will be visible for observation most of the month.

Predicted to be of third magnitude which is easily visible with the eye alone, Dr. Elizabeth Roemer of the U.S. Naval Observatory in Flagstaff, Ariz., reported that she does not expect the comet to be that bright but rather about fifth magnitude. An object of fifth magnitude could be seen in the sky as a very faint object when observed with the naked eye if one knows where to look. It would be easier to see with binoculars or telescopic aids.

At the present time the comet is approaching the sun and will reach its closest approach of about 47,000,000 miles on March 20. About April 1, it will have traveled far enough away from the sun to be visible in the morning sky.

The comet is moving from south to north and by the end of the month it will be near Polaris, the North Star. As it travels north across the constellation Aquarius, it will cross part of Pegasus, and before it skirts Polaris toward the close of the month, it will pass by Cygneus, the northern cross, and Cepheus as well as Draco, the dragon.

Around April 30, the comet will go across Ursa Minor, the small bear, which contains Polaris, the North Star. At this time it will be closest to earth, about 20,000,000 miles, and will move very fast across the sky. It will be seen in the evening sky by this time, Dr. Roemer said.

The Comet Burnham has a tail which seems to be growing. Dr. Roemer said it was about one-third of a degree long last time she saw it, about the middle of February.

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ROENTGENOLOGY

Bone Growth Movement Now Filmed with X-Rays

TINY MOVEMENTS that occur during the growth of bones and healing of fractures can now be observed through a new technique involving time lapse X-rays.

Though it has long been known that motion of the broken parts impedes fracture healing, the new method shows among other things that even tiny movements, too small to be detected by conventional X-ray studies, can cause poor bone union.

The method was developed by Dr. Howard J. Barnhard, radiologist at Hahnemann Hospital of Philadelphia and assistant professor of radiology at Hahnemann Medical College.

The new technique, which the radiologist described as "resembling both time lapse and animation movies," involves making X-ray films of a dog's foreleg at four-hour intervals during a period of observation lasting weeks or months. The advantage of this method over the usual interval X-ray studies is that it affords continuous, regular observation of the bone under conditions where position of the limb and film density can be kept constant.

The interval X-ray films are put together like the separate frames of a motion picture, creating an impression of movement. Since the eye more readily perceives motion than still images, the process of change is actually intensified to the observer. This is the first time that the living animal has been reported upon through the technique of time lapse filming.

"Nearly everyone is acquainted with the beauty of the plant kingdom revealed by the time lapse method," Dr. Bernard commented, "but in neither plant nor microscope work is immobilization of the subject a problem."

The radiologist achieved immobility of the parts under study in a dog subject by implanting pins in the bones of the forelegs. These pins act as guides for positioning the leg each time the animal is brought for X-raying. Applications of the new method will be most useful in medical teaching and research, the radiologist predicted.

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SURGERY

Surgery Saves Babies Having Heart Defects

THE LIVES of babies born with a serious defect of arteries arising from the heart may be saved and sustained by a new surgical procedure.

The new technique is reported from the University of California, Los Angeles, where Drs. Arthur J. Moss, James V. Maloney Jr. and Forrest H. Adams developed the procedure to temporarily correct the condition known as transposition of the major heart vessels.

A baby born with this condition has the pulmonary artery arising from the heart chamber where the aorta normally originates and vice versa. (The pulmonary artery is the vessel through which blood is pumped to the lungs. The aorta is the large vessel which supplies blood to the rest of the body.) In these babies blood does not contain sufficient oxygen so that they are intensely blue and usually die not long after birth.

Permanent surgical correction by switching these major vessels is mechanically possible but has not been successfully accomplished. It requires use of the heart-lung machine, a procedure which infants do not tolerate well.

In the new procedure, which requires no heart-lung machine, a hole is made between the two upper heart chambers. A branch of the displaced pulmonary artery is linked to a vein returning blood to the heart. This allows more oxygen to mix with the blood supplying the body tissues.

The procedure has been employed in six cases. Three babies died because of their poor condition at the time of surgery. In the three survivors improvement was dramatic. All signs of heart failure disappeared, appetites increased, the weight became normal. Two are no longer blue.

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COMET IN FLIGHT—The Comet Burnham, taken by Dr. Elizabeth Roemer with the 40 inch reflector at the U. S. Naval Observatory at Flagstaff, Ariz. The comet's tail was one-fourth of a degree long when this picture was taken.

SURGERY

Surgery After Heart Stops

A BRAIN TUMOR has been removed from a patient whose heart stopped just before surgery began.

The surgeons who performed the operation, Drs. Alfred Uihlein, Robert G. Lippert, and John S. Welch of the Mayo Clinic, Rochester, Minn., believe the operation was successful because they subjected the patient to hypothermia (lowering of the body temperature).

If the heart stops, the brain is quickly damaged. The Mayo surgeons used hypothermia to minimize this brain damage.

The case history of their 35-year-old, male patient, reported in the Proceedings of the Staff Meetings of the Mayo Clinic, 35:82, 1960, included several head injuries and convulsive seizures. Laboratory tests showed a lesion on the under side of the brain. This lesion had pushed the brain slightly askew. Surgery was needed to remove the lesion.

While the general anesthetic was being given, the man's heart stopped. Immediately his chest was opened under unsterile conditions and the surgeon began heart massage.

After 30 to 60 seconds, the heart began to beat regularly. Two and one-half minutes after the heart had stopped there was a pulsation in the wrist again. Blood pressure, pulse and breathing were stable within 35 minutes after the chest incision was closed.

Now the question arose: Should the patient be subjected to the added physical shock of an operation?

The brain was already in danger of damage from the earlier heart arrest. Pressure inside the brain, purposely introduced during one of the pre-operative tests, might kill the patient or cause the heart to stop again if the space-occupying lesion was not removed immediately. The decision: continue.

A refrigeration blanket was wrapped around the patient, forcing his body temperature to drop four degrees in one hour. The tumor, containing blood and a small nodule, was then removed.

There was no sign of brain or nerve damage and the body temperature then was allowed to creep up to normal.

The patient made a rapid recovery. At the time of his discharge, his heart was behaving normally. He had a slight weakness in the left arm, but this had been severe before the operation. This condition was slowly disappearing.

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PUBLIC HEALTH

Ragweed Control Urged

WAGING an organized weed control program every year can help a community rid itself of ragweed pollen, which is responsible for the nation's 10,000,000 to 12,000,000 hay fever sufferers.

A few years of weed control would be all that would be necessary to reduce the growth of ragweed to a minimum, Charles N. Howison, executive secretary of the Air Pollution Control League of Greater Cincinnati, told the Weed Society of America meeting in Denver, Colo.

Hay fever caused by ragweed pollen pollution of the air, he said, is a preventable man-made disease of nationwide importance. Together with asthma it is the third most common chronic disease in the country, preceded only by heart disease and cancer, and is the one disease that can be traced to an air pollutant.

Ragweed is an annual and grows in every state. One plant can pollute the air with from five to eight billion pollen granules. One acre of ragweed fills the air with 50 to 60 pounds of pollen a season. One square mile liberates 16 tons of pollen.

Ragweed will not seed if destroyed before it flowers, Mr. Howison reported. Every plant destroyed before it blossoms reduces the volume of pollen pollution of the air.

Fortunately, he said, methods for the control of the plant are well known. Herbicides such as 2,4-D and others are available, effective, safe, easy and economical to apply.

Tests have shown that the toxicity of the pollen, as well as its volume, is greatly reduced the farther away it gets from the plant. Thus the closer the sufferer to the plant, the more irritating its pollen.

Cutting or destroying ragweed with chemicals during the growing season limits the source of fresh pollen and reduces the amount of fresh pollen that can reach the sufferer and cause irritation.

Every community, Mr. Howison said, can be made safer, healthier and more beautiful by waging an effective weed control program annually. Hay fever victims as well as everybody else will benefit by the eradication of this air pollutant, he said.

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TECHNOLOGY

Push-Button Lock Is Tamper-Proof

A TAMPER-PROOF lock to safeguard the custody of classified atomic secrets and other important documents has been developed by scientists of the British Atomic Energy Authority.

The lock has no key and the combination, unlike most safe combinations, cannot be detected by an attentive ear or deft fingers.

It operates by pressing four of 12 buttons, which operate in pairs. To open the lock, only two pairs have to be pressed.

It does not matter in which order the buttons of each pair are pressed, but both buttons of the first pair have to be operated before the two buttons in the second pair.

If a false move is made, or one of the second pair of buttons is touched before the operation of the first pair is completed, an electronic circuit is brought alive and sounds warnings wherever desired.

The buttons can be numbered or lettered, or both, so the code for opening the safe can be a combination of four letters or four figures or a combination of both.

The sequence of buttons for opening the safe can readily be changed, with a total of 4,356 possible combination variations.

Science News Letter, March 19, 1960

SCIENCE NEWS LETTER
VOL. 77 MARCH 19, 1960 NO. 12

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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GENERAL SCIENCE

Youth Explores Science

The 40 Science Talent Search winners all worked on projects that displayed ingenuity, originality as well as scientific know-how. The versatility of the group is evident.

BELONGING to a generation that seems destined to do a good deal of moving around in space, three 17-year-old "sky scientists" have been looking into the finer details of what goes on out there.

Extensive studies of weather and atmospherics have been made by Dennis G. Baker of Winchester, Mass., and James V. Mardis of La Mesa, Calif., while Samuel R. Friedman of Washington, D. C., has been analyzing dark markings he observed on the planet Saturn. The reports of these young researchers helped them to earn national recognition as three of the top 40 winners of the 19th Science Talent Search conducted by Science Clubs of America, an activity of SCIENCE SERVICE.

Four years of climatological data on the weather gathered by Dennis include detailed daily records of temperatures, precipitation, and optical phenomena such as rainbows, auroras, halos, coronas and sun dogs. The notes of this future atmospheric physicist contain 12,000 hourly and 1,500 maximum-minimum temperature readings, data on the frequency of thunder during thunderstorms, photographic records of cloud forms occurring at his Massachusetts station, and observation on the length of the growing season of various plants.

James explains his special subject of atmospherics as audio-frequency electromagnetic waves that are emitted when conditions in the upper atmosphere are violently changed. The characteristics of the signal received "fingerprint" the upper atmosphere, yielding an amazingly accurate picture of meteors or missiles re-entering the atmosphere, radiation from the sun or nuclear weapons, or large amounts of gases ionized at low altitudes.

Analyzing more than a hundred drawings he has made from his observations of Saturn during the spring and summer of 1959, Samuel has concluded that visibility of the dark markings of the North Equatorial Belt on Saturn is greatly affected by the reflection of light from the rings and/or possible inaccuracies in his drawing technique.

To increase the statistical accuracy of his study, Sam plans to analyze available drawings from observations of Saturn made in the summer and fall of 1958 and to include more than 300 drawings of Jupiter in his calculations.

Talented Girl Scientists

THE "BREATHING" of plant cells, a substance in beans and peas that coagulates human blood, and the story of ancient forests told by fossil pollen grains have been the special concerns of three feminine scientists from high schools in New York, Arizona and Wisconsin who are among the 40 winners.

Challenged by the importance of explorations going on in biochemistry, Barbara A. Ash, 17, of Tonawanda, N. Y., has studied the "breathing" of plant cells. Investigating the respiratory intensities of the tissues of potatoes, carrots, cauliflower, rutabaga, radishes and apples, she found that carrots and cauliflower absorb much more oxygen per gram than any of the other tissues she tested.

Another 17-year-old was finding a substance in native beans and peas that causes clumping of human red blood cells. Having learned that most of the research in this field has been done in Israel, Gayle A. Edlund reasoned that, since Arizona's climate is similar to that of the Middle East, it might be possible to find such agglutinins, or lectins, in the plants of her own state.

In the 22 species of beans and peas she studied, she identified four lectins, two of which have never been reported.

In Marshfield, Wis., Virginia V. Perner, also 17 years old and the sixth consecutive Science Talent Search winner from Columbus High School, has studied the postglacial vegetation of peat bed areas in five counties. After removing fossil pollen from samples of the peat, Virginia counted, identified and made photomicrographs of the pollen grains.

From 10,000 counts of fossil pollen she has identified 15 species of plant life and established that pine was dominant in the forests of all five counties.

Aphids and Centipedes

APHIDS, the tiny pests that cling stickily to nasturtiums or chrysanthemums cut for your table arrangement, and the "thousand-legger" that runs out from under your woodpile are particular enthusiasms of two young scientists in New York and Florida.

To find out more about aphids, Richard A. Applebaum, 16, of Brooklyn, raised them on nasturtiums in four boxes, each of which was covered with a different colored gelatin-film filter. He found that both red and yellow light stimulate reproduction of wingless aphids, but cut down on the number of winged offspring which spread plant virus diseases. Blue light seemed to reduce reproduction, but encouraged winged offspring.

Centipedes and millipedes are "misunderstood and disregarded" arthropods, according to William J. Platt III, 17, of Gainesville, Fla.

This future entomologist has spent many months and some 800 hours on field and

(Continued on p. 189)

RARE CENTIPEDES—Two of the centipedes given to the Smithsonian Institution by William J. Platt III, of Gainesville, Fla., one of the 40 winners of the Science Talent Search. One of the rare centipedes was the first female specimens of N. xenopus (Bollman).

GENERAL SCIENCE

Top Young U.S. Scientists Chosen

The winners of the 19th Annual Science Talent Search scholarships come from all kinds of environments, farms, towns and cities. Meet our winning scientists.

See Front Cover

THE NATION'S top young scientist of the year is Jerome G. Spitzner, 17, of St. James, Minn., seen on the cover of this week's SCIENCE NEWS LETTER. The husky young farm-boy physicist used unusual odds and ends to build an ion accelerator at a cost of less than $35.

He won the top $7,500 Westinghouse scholarship of the 19th annual national Science Talent Search conducted by Science Service, a contest which started with almost 4,500 completed entries.

Four other scholarships were awarded (March 7) after five days of judging in Washington:

$6,000 to Melvin Hochster, 16, of Brooklyn, N.Y., a mathematician ever since his sister gave him her old math books when he was nine years old.

$5,000 to Frank A. Podosek of Ludlow, Mass., 18-year-old research scientist who has developed apparatus to measure the rate of expansion of heated liquids.

$4,000 to Charles H. Bennett of Croton-on-Hudson, N.Y., 16-year-old biochemist, who has done a study on the respiration of freshwater snails.

$3,000 to a sparklingly feminine petite chemist, Betty Lou Snarr, 17, Oklahoma City, Okla., who has worked out a relatively simple plan to determine the molecular structure of complex sugars.

Ion Accelerator

The ion accelerator that was part of Jerry Spitzner's winning entry in the Search was built in his laboratory, an old chicken house of his father's farm. It is a scale model of his design for a machine that someday might harness atomic power. This one is put together with such items as a float from a pig-waterer, a silver-painted Christmas tree ball, parts of old television sets, and equipment supplied by St. James High School, where he is a senior, a nearby college and a local radio shop. Blessed with what his teacher describes as an endearing sort of "humble-confidence," Jerry is hailed for his scholastic, scientific, and wrestling squad prowess. He has been offered several athletic scholarships because of his record in sports. His plans for his professional future are built around a desire to open up new opportunities and relieve world tensions through providing cheap and abundant fusion power for space travel and private and industrial use.

Melvin Hochster, senior at New York's Stuyvesant High School, was absorbing college algebra and calculus texts while he was still in junior high school and now does original work in number theory as a hobby. The research paper that he submitted as part of his entry in the Search described his investigation of diagonal sums in a right Pascal's triangle which yields sets of numbers with interesting properties when read from various angles. Because discovering and proving unobvious but simple ideas particularly delights Melvin, he looks forward to a lifetime of research in mathematics.

Tall, blond Frank A. Podosek, senior at Technical High School in Springfield, Mass., enjoys testing new and sometimes unconventional ways of solving scientific problems and finds science "not work, but recreation." The problem he reported to the Science Talent Search concerned the measurement of the coefficient, or rate, of thermal expansion of various liquids and many of their solutions. His objective was the discovery and analysis of relationships between the coefficients for particular liquids and those of their solutions. Since Frank's interests range over such fields as chemistry, nuclear and atomic physics, electronics and missiles, he believes his professional future will be eminently satisfying if he can carry on original research in any or all of these disciplines.

The musician parents of Charles H. Bennett, senior at Croton-Harmon High School, Croton-on-Hudson, N.Y., have provided a background of warm encouragement of his interest and ability in science. Impressed by the enthusiasm and character of the working scientists he knows, this 16-year-old high school senior is looking forward to a "very good life" as a biochemist. Charles' project paper reports his research on the respiration of freshwater snails. Using six aquatic snails in containers of pond water which he heated in his mother's kitchen oven, he determined the approximate rate of dissolved oxygen consumption and the relationship between the concentration of dissolved oxygen and the rate of consumption. Charles hopes to expand his study to include the rate of respiration of other animals such as sponges and goldfish.

Girl Chemist Wins

The field of physical chemistry will be brightened a few years hence by the addition to its ranks of pretty, five-foot-two Betty Lou Snarr of Classen High School, Oklahoma City. Betty has designed a simplified technique for finding the molecular structure of polysaccharides, a method she now wants to test and improve for use with dextran and to solve the structures of lesser known polysaccharides. This diminutive "lady-in-a-lab-coat" is equally at home in a bouffant dance formal and corsage, enjoys golf, oil painting, sketching, piano, chess, stamp collecting and microbiology, and expects to get her general class amateur radio license next summer.

John M. J. Madey, 17, of A. L. Johnson Regional High School, Clark, N.J., was named as alternate to the $3,000 scholarship.

Eight girls and 27 boys received Westinghouse Science Awards of $250 each in recognition of their outstanding promise as creative scientists of the future.

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OPTICS

Tiny Tube Will Do Work Equal to Big Telescope

A PINT-SIZED electronic tube has been developed by Westinghouse Electric Corporation that may make big telescopes out of little ones, enabling astronomers to get pictures of the heavens never before obtainable.

Called an Astracon, the light-amplifying tube is said to be so sensitive that it makes visible to the eye every individual elementary particle of light that triggers its ultra-sensitive input. It can increase the effective size, or light-gathering ability, of even the largest telescopes many times over.

The tube, which is also expected to find application in other fields of research such as nuclear physics, was described in Washington, D. C., to 40 teen-age winners of the 19th annual Science Talent Search, administered by Science Service, by Dr. J. W. Coltman of the Westinghouse research laboratories, Pittsburgh, Pa.

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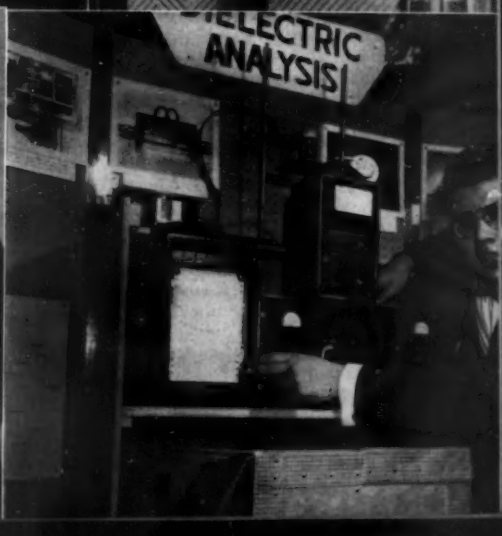
SCIENCE TALENT WEEK — Top winners with their projects in the Science Talent Search and activities during STS week. Top, left, is Melvin Hochster. Below him is Frank A. Podosek, and to the right the group of 40 winners of the Science Talent Search.

Center, left, is Charles H. Bennett. To the right Betty Lou Snarr is seen. Far center right, Irving Spitzberg presents Dr. Watson Davis of Science Service and Dr. Howard S. Kaltenborn of Westinghouse with a cup of appreciation from the 40.

Bottom, left, a group in the Smithsonian Hall of Minerals. From left to right are—Arthur Taylor Winfree; John Wesley Shaner; Paul E. Desautels, a curator; and Dr. Leonard Carmichael, president of Science Service and secretary of the Smithsonian Institution. At bottom right, John M. J. Madey.

THERMISTAT


ELECTRIC
ANALYSIS

ORNITHOLOGY

Drought Reduces Ducks In the Pacific Flyway

THE WINTER duck population of the Pacific Flyway is 18% below last year's total because of a four-year drought in the heart of the Canadian "duck factory," the Bureau of Sport Fisheries and Wildlife, Washington, D. C., reported.

Other Pacific Flyway data show that goose populations are down four percent, swans are off 10% and coots are down 17%. The only increase was noted in the black brant, which was up 53%.

A flyway is an established air route of migratory birds. The Pacific Flyway is one of the country's four major flyways. The others are the Central, Mississippi and Atlantic Flyways.

Only Washington and Oregon showed an increase in ducks. The rest of the flyway, which includes Alaska, western Canada, the west coast of Mexico, Nevada, Idaho, California, Arizona and Utah, showed varying declines.

The drought-hit area — Saskatchewan, Alberta and parts of Manitoba—is one of the best waterfowl-producing areas. The intense drought started four years ago and is still continuing, but current reports indicate this year's snow cover in the area is heavier than it has been in the last two or three years. This may mean a break in the drought soon.

A total of 364 state and Federal observers participated in the Pacific Flyway survey. Cars, boats and planes covered more than 30,000 miles in making the inventory.

Science News Letter, March 19, 1960

MILITARY SCIENCE

Do Not Waste Scientists In Combat, Says Expert

THE SELECTIVE SERVICE ACT must be revised to conserve the United States' supply of engineers and scientists, a manpower expert reported.

Dr. Sydney B. Ingram of New York, vice-president of the Engineering Manpower Commission of the Engineers Joint Council, said the United States cannot afford to send highly trained engineers and scientists into another Korea.

He would like to see the Selective Service Act revised so that these technically trained person can discharge their duty time in vital work either in or out of the armed services.

At present, draft boards have the policy of passing over scientists and engineers. But Dr. Ingram fears this would not happen if there were an emergency; in fact, scientists and engineers, having been passed up for peacetime draft, might be called up in great numbers because they have not served before.

Dr. Ingram wants the Selective Service Act revised so that:

1. Young scientists get called by the draft just as young men in other fields.

2. If they are already doing vital work they are not exempted but their work is counted as military service.

3. If they are drafted, they get a minimum of basic training and "housekeeping" and are sent, as quickly as possible, into vital military work where their past training can be used to maximum benefit.

Dr. Ingram would further like to see special scientific corps in the Army, Navy and Air Force. He believes these corps might use scientists and engineers to best advantage.

Above all, Dr. Ingram warned, the U. S. must avoid wasting its highly trained personnel in front line combat. This does not mean, he said, never putting them into combat if they are most useful there.

"The important thing, of course," Dr. Ingram said, "is to use highly trained scientific personnel where the need is greatest, whether this involves physical danger or not."

The present Selective Service Act is outmoded, Dr. Ingram said. "Its concept is based on the idea of equal sacrifice, no matter how valuable the individual is to society."

Science News Letter, March 19, 1960

ASTRONOMY

Light of New Star Areas Not Same in All Space

AN ASTRONOMER has just found evidence to show that the distribution of brightness among newly formed star areas is not the same in all regions of the universe at all times—contrary to a generally accepted assumption of uniformity.

Dr. D. N. Limber of the University of Chicago's Yerkes Observatory, Williams Bay, Wis., has concluded that the brightness of newly formed star areas is influenced by the density, amount of turbulence among the stars, temperatures and chemical composition of the matter present in a region.

First Dr. Limber figured out the original brightness of well known stars. Results indicated that some of these stars should be more than 20 billion years old. Since this seemed older than could be reasonably expected, Dr. Limber saw as the only other possibility that initial brightness can vary in different parts of a galaxy or from one galaxy to another.

Science News Letter, March 19, 1960

MINERALOGY

Smithsonian Is Given Rare, Black Diamond

A BLACK DIAMOND weighing 740 carats and believed to be the largest ever found in French Equatorial Africa has been presented to the Smithsonian Institution, Washington, D. C. Black diamond, also called carbon or carbonado, is an opaque, black, tough and compact variety of diamond and is found primarily in French Equatorial Africa and Brazil. It is the most satisfactory form of diamond for diamond rock drilling. Its relatively limited use is due chiefly to its comparative scarcity. The black diamond gift was made by Diamond Distributors, Inc., and is believed to be the largest mass of black diamond in any museum in the world.

Science News Letter, March 19, 1960

IN SCIENCE

MEDICINE

Appendix on Left Linked With Male Sterility

SOME CASES of sterility in men may be due to an inherited condition which causes the organs of the body to be formed on the right side when they are usually on the left and vice versa.

Visceral transpositions, as the condition is called, means that the appendix, liver and ascending colon are on the left, and the stomach, spleen and descending colon are on the right. This is just the opposite of the usual placement. The heart also works backwards, sending signals from a pacemaker on the left instead of the right.

Studies by Danish scientist E. Arge, reported in The Lancet, 1: 412, 1960, showed that in one family tree all the married men had children except those with visceral transposition. Wives of two of these men were past childbearing age, and the husbands would not submit to examination for sterility. However, in the third case, the wife had had two children by a previous marriage and the husband accepted examination.

Tests revealed that fertility of this man was much below normal. Sperm became inactive sooner and live a shorter life than usual: 47% had abnormal head shapes.

There was one case of visceral transposition in one of the women in the family. However, she had one child.

Science News Letter, March 19, 1960

AERONAUTICS

Private Pilots to Get Device to Tell Location

EQUIPMENT that will quickly tell a private pilot exactly where he is will soon be available, the Federal Aviation Agency in Washington, D. C., reports.

The lightweight, low-cost equipment will automatically transmit electronic impulses from the plane to the nearest of 250 ground stations (VORTAC units). The unmanned station will respond with a signal.

This signal will be translated by the airborne device to give the pilot his distance from the station. Combined with directional information from the ground units, the distance information will pinpoint a plane's location.

The distance units on the ground are to be ready for use by the end of June. They will be along air routes. If an automatic unit fails, a spare will automatically take over until the first unit is repaired.

Delivery of the first complete unit of distance measuring equipment for private aviation is scheduled for September. Each unit will retail at about $1,500 and will weigh about 16 pounds.

Science News Letter, March 19, 1960

NCE FIELDS

OCEANOGRAPHY

Bed-Cracks in 2 Oceans Found to Be Continuous

DEEP CRACKS in the beds of the Atlantic and Indian Oceans have been found to be continuous formations joined south of the tip of Africa.

The discovery, made by Columbia University's research vessel Vema, may help determine the origin of the major surface features of the earth and changes that have taken place in its geological history.

A few years ago, existence of a 45,000-mile undersea crack in the earth's crust was confirmed. It was inferred from topographic and earthquake data that this crack was continuous.

The Vema, now on a 12-month scientific cruise that will include circumnavigation of the Antarctic continent, had as a major objective the examination of this crack, or Mid-Ocean Ridge.

Six crossings of the ridge in the Indian Ocean revealed that the crack was continuous and that it followed a world-wide active earthquake zone along its entire length. The crack was also found to be about a mile deep and from one to five miles wide at the bottom and from four to 20 miles wide at the top.

Science News Letter, March 19, 1960

PUBLIC HEALTH

Standards Suggested for Cancer Test of Additives

A GROUP of experts has suggested standard tests for food additives that may cause cancer in man.

The Food Protection Committee of the National Academy of Sciences-National Research Council began studying the problem of food additives and cancer in 1956, long before cranberries and chemically fattened chickens came to public attention.

A review of completed tests and a realization of the problems involved prompted the Committee to suggest three long-term tests for evaluating the cancer-producing powers of food additives:

1. Continuous feeding of various levels of the test substance to rats and mice for their normal life spans and to dogs for at least four years.

2. Repeated surface application of various amounts of the test substance to the skin of mice for the normal life span.

3. One large, under-the-skin injection of the test substance in mice and extended observation of the animals.

The Committee's report, "Problems in the Evaluation of Carcinogenic Hazard from Use of Food Additives," which has just been released in Washington, D. C., showed that up to 1953, some 516 compounds had been reported as tumorigens (agents which cause benign or malignant tumors). Of this number, 40 fell into the "not proved" category.

"Not proved" compounds were so designated because, in many cases, they had been tested only once, the controls were inadequate or the tumor had not been examined to see whether it was cancerous or not.

More than 450 compounds did show acceptable evidence of tumorigenic activity. Almost half of these belong to one chemical structure group, the polycyclic aromatic hydrocarbons.

Various species of laboratory animals react differently to these and other tumorigens. As a result, through no fault of their own, research workers sometimes tested compounds on guinea pigs when a more sensitive and accurate test could have been made on mice.

The Committee's suggestions are designed to help eliminate such mistakes in the future. Included in the report is a discussion of the relative sensitivities of lab animals.

Science News Letter, March 19, 1960

NUTRITION

Clue to Low Pellagra Rate For Tortilla Eaters Found

WHY PELLAGRA is rare in countries where tortillas are a basic part of the diet may have been found by three biochemists at the University of Wisconsin.

Rats fed corn treated with alkali grow better than those eating untreated corn, A. E. Harper, B. D. Punekar and Dr. C. A. Elvehjem reported. Because corn used in tortillas is treated with lime in much the same way the biochemists treated the rat corn, it may be that this treatment keeps down the pellagra rate in tortilla-eating areas.

Pellagra is a nutritional disease caused by a lack of niacin, a member of the vitamin-B complex.

Alkali or lime treatment is thought to be sufficient to make some of the bound niacin in the corn available for absorption from the digestive tract.

Science News Letter, March 19, 1960

PUBLIC HEALTH

Strontium-90 in Bone Hit Peak in 1959

THE LEVEL of strontium-90 in newly formed bone hit a peak in 1959 and is expected to constantly decline, a Westwood, N. J., scientist reports.

If the amount of strontium-90 in the diet depends on the rate of fallout rather than on the cumulative surface burden, the maximum concentrations in newly formed bone should have been reached in 1959, Dr. Herbert W. Feely of Isotopes, Inc., reports in Science, 131:645, 1960.

Therefore, concentrations should decrease rapidly in the next few years if there are no more bomb tests. He bases his conclusions on studies of the rates of release of debris of bomb tests of the U. S., Russia and Great Britain.

Science News Letter, March 19, 1960

BIOLOGY

Algae Resist Radiation Better Than Higher Plants

CERTAIN ALGAE have been found to be much more resistant to radiation than higher plants and animals, it is reported.

Dr. M. B. E. Godward of Queen Mary College in London describes radiation experiments with eight different types of algae which were maintained in culture as long as possible after radiation. It has been found that recovery could follow in a matter of days but might need up to five weeks.

In those algae where the chromosomal organization is conventional or large in size, Dr. Godward reports in Nature, 185:706, 1960, resistance to radiation seems to be relatively low.

Small chromosomes such as those of Chlorella, on the other hand, are almost impossible to kill by radiation. No organism that he knows of has been reported as surviving an experimental dose of radiation as high as the two successive doses of 1,000,000 rads each given Chlorella, Dr. Godward reports.

He points out, however, that the marine algae which received considerable radiation from atomic explosions were not killed.

Science News Letter, March 19, 1960

MEDICINE

300-Yr.-Old Tuberculosis Epidemic Approaches End

THE END of a tuberculosis epidemic that has lasted nearly 300 years is being reached, Dr. H. D. Chalke, medical officer of health of the London borough of Camberwell, believes.

Nature, Dr. Chalke said, has begun extinction of the disease and now man can speed its end.

Dr. Chalke said the disease had been affecting Western peoples since the 17th century.

For 200 years it burned freely but, early in the 19th century, the conflagration began to die down. It has continued to subside virtually without interruption since then. "Galloping consumption" was faltering before the chemotherapeutic era.

The disease declined steadily when hygiene and sanitation could hardly have been worse and when cholera, typhoid and typhus were prevalent.

"Man seems to be 'coming to terms' with tuberculosis," Dr. Chalke reported. "He may well have done so before in history. The death rate began to diminish long before control schemes were put into operation, 70 years, in fact, before the first anti-tuberculosis dispensary was opened."

In 1680, the state of society and the way of life were predisposed to the sudden flare-up of the disease.

"Today, our contribution can be greater than ever before and it may prove effective in speeding the end." The foundation of future effort, Dr. Chalke said, must be swift elimination of local epidemic sources.

Science News Letter, March 19, 1960

GENERAL SCIENCE

Progress Demands Basic Research

The creative scientist needs an insatiable desire to learn and a willingness to discard outdated concepts. He should feel at home in many fields as the sciences grow closer together.

By DR. GEORGE B. KISTIAKOWSKY

Special Assistant to the President for Science and Technology

Excerpts from an address given at the awards banquet of the 19th Annual Science Talent Search in Washington, D. C., March 7.

MR. DAVIS, Mr. Kaltenborn, Dr. Carmichael, Science Talent Search judges, winners and distinguished guests. First I should like to convey greetings to each of the winners and congratulations from President Eisenhower. He regrets that it was not possible to meet you personally, as in previous years, and has asked me to extend to you his very best wishes for your continuing success.

May I thank you most sincerely for inviting me to address this Westinghouse Science Talent Search Awards Banquet. Congratulations to the Westinghouse Educational Foundation, to Science Service, and to the Science Clubs of America for their contributions to our scientific strength.

The other day I noted a news dispatch from the Florida spring training camps. It included some rather frank appraisals of another facet of American strength and a thought occurred to me. If that ultra-realist—Casey Stengel—were surveying the country's scientific talent, would he hesitate to conclude that we have got to build up our farm system if we want to keep winning pennants? In this sense we owe a special debt to Science Service and the Science Clubs. They have assumed the missionary task of carrying the message of science and technology to the far corners of America. In the vernacular of Casey, they are beating the bushes for the most talented rookies.

Many Math Majors

The other day, a colleague of mine was talking to one of our most respected younger mathematicians. They were discussing the reasons for the current sharp increase in mathematics majors in colleges and universities across the country. The mathematician observed that the rising interest in mathematics could possibly be traced to the glamour of high speed computers or to the excitement about outer space science and technology. But, he added, based on his own observations, it was unlikely that many of these new math majors understood why they have made this selection—regardless of what their explanation might be. He cited his own experience, shifting, while an undergraduate, from chemistry to mathematics. He could not explain his underlying motivations then or since. I am sure that similar intellectual migrations have been experienced by others of our foremost scientists and engineers. Thus, of the two Nobel Laureates in Physics who are members of the President's Science Advisory Committee, one earned his bachelor's degree in electrical engineering and the other in chemistry.

To become a creative scientist one needs good education, but one also needs something far more essential. It is the insatiable desire to learn, throughout one's professional life, a willingness to discard outdated concepts and to absorb new knowledge. Deficiencies in formal education can be overcome. Take my own case. Through the vicissitudes of the Russian revolution and civil war, I missed the last year of high school and had to compress my undergraduate and graduate university education into four and a half years. Leaving the University of Berlin, Germany, with a Doctorate of Philosophy degree, I had a store of knowledge certainly less than that of a Science Bachelor. In fact I knew very little outside the field of chemistry. But in those days sharp lines of demarcation existed between traditional disciplines, like chemistry and physics. One could be a researcher knowing little outside one's own little bailiwick. Those days are gone.

As we push back the frontiers of the unknown, the lines of demarcation between sciences fade away. The intellectual interests of a scientist have to be keyed to the unity of science, responding to the seamless web of nature that binds the physical and animate worlds. I could not stay in science unless I kept studying and filling out the frightful gaps of knowledge that my formal education—or lack of it—bequeathed me. Modern physics, math, biology, had to be learned almost from scratch. Then came the war. I was assigned to research on high explosives and rocket propellants and had to learn a lot about fluid mechanics. Since the war, electronics had to be studied, because one needs it nowadays to do research. And so, you see, I was in school not four but nearly forty years.

Know Many Fields

Today, a youngster with my lack of formal education is hopelessly lost. In fact, these days there is increasing need for scientists who feel at home in many fields of science, what might be called the true interdisciplinarians. For example, the oceanographic and atmospheric sciences require for their advance the application of principles and techniques from several scientific disciplines. Perhaps because of this they are undernourished fields, in terms of gifted scientists as well as in resources for their support.

CONGRATULATIONS—Jerome G. Spitzner (center), of St. James, Minn., who won the $7,500 Westinghouse scholarship, is congratulated by Dr. Howard S. Kaltenborn (left), Vice President of Westinghouse Electric Corporation, and Dr. George B. Kistiakowsky (right), Special Assistant to the President for Science and Technology, the speaker at the Awards Banquet.

Science and engineering have also grown closer together. The radical shortening of time between scientific discovery and its application has tended to bring scientists into more intimate contact with the engineers. In fact, many creative scientists have moved from their laboratory benches to the ranks of engineers. Fortunately, this has been a two-way flow. The engineers have undertaken to support basic scientific advance through the construction of great scientific instruments such as radio-telescopes, high energy particle accelerators of scientific satellites—marvels of engineering, indispensable for modern science.

Unfortunately, as a result of the narrowing of the boundary between science and technology, the work of the scientist has become confused with that of the engineer. They are not the same. The scientist searches for new knowledge, guided by his urge to learn more about the workings of nature. The engineer, on the other hand, is concerned with the achievement of practical goals which advance human welfare or national security. Basic scientific research is indispensable to provide the ever new tools for technology, but this is most often an unpredictable result of such research rather than its objective.

Take the case of the "Hertzian waves," the electromagnetic radiation. If Heinrich Hertz had been asked to devote his energies to producing a device for communicating over long distances without wires, he might very well have turned to semaphore and telescopes, or to light signals, or to some other application of already conventional principles. But he was interested in finding out if the electromagnetic waves predicted by Maxwell really existed, and so contributed something of fundamental importance to our understanding of the universe. It remained for a student of Hertz, named Marconi, to find the first practical application for his professor's discovery—radiotelegraphy.

Basic Research Is Key

You might ask, why lay stress on differentiating betwen science and engineering? Doesn't it run contrary to the intermingling of the disciplines and the erosion of traditional boundaries within and among scientific and technical fields?

The reason is this. The future growth and vitality of sciences in the United States depend upon public understanding of the nature and importance of the function of basic research. It depends on general appreciation that the difference between basic research and engineering is a fundamental difference in the intellectual processes and motivations involved. It requires an awareness that only some 27,000 scientists and engineers in this country are engaged in developing new scientific knowledge, about nine percent of our total number of scientists. On this little band of scientific explorers rests the burden of catalyzing our industrial and cultural progress.

As a result of the equating of science and technology, many have concluded that the $8 billion estimated to be obligated in fiscal year 1960 for Federal scientific research and development provides ample support for research.

Actually, ninety-four percent of this amount is in support of development and applied research—leaving less than $500 million for basic research. Still, this amount is a sign of major progress in gaining public acceptance of the need to support basic research.

Government Promotes Science

This year marks the tenth anniversary of the creation of the National Science Foundation—a remarkable innovation in the history of the United States Government. It was established by the Congress to promote the progress of science; and advance the national health, prosperity and welfare. It alone could initiate and support basic scientific research without relating it to any utilitarian mission. In ten years its annual budget has risen from $3.5 million to the $192 million proposed for the next fiscal year.

Although there are thus encouraging signs of increasing public support for basic scientific research, this support is sustained really only because of the admitted importance of science to our national security, economy and health. I doubt that scientific research is recognized and appreciated in its own right as a creative activity of the mind that enhances man's understanding.

To some, such recognition may seem to be unnecessary and unimportant. But basic research is a fragile flower that needs the nourishment of encouragement and understanding, as well as material sustenance.

Change of Attitude Needed

A change in public appreciation of basic research is, of course, difficult to accomplish and will take education and considerable time. Our present public attitude is a product of more than a century and a half of pragmatism born of the immediate necessity of developing and harnessing our national resources. It was a necessity more compelling than the tradition of scholarly pursuits.

We need both of these in our society: the unquenchable, free, probing into the unknown to expand the boundaries of knowledge; also the humanistic articulation of scientific knowledge that links it to the betterment of mankind.

Some of you will be inclined in one direction; some will be headed in the other. We shall need both—moreover, *you* will need both kinds of activities to insure for yourselves an almost limitless future that can be had if solidly grounded on the broad base of knowledge.

As I speak of the future, I am tempted to paraphrase Charles F. "Boss" Kettering, one of the greatest applied scientists of our age: the future is the main concern to our young people, because they are going to do all their living in it.

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• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenience purchase of any U. S. Book in print, priced at 95¢ or over, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIRCRAFT AND MISSILE DESIGN AND MAINTENANCE HANDBOOK—Charles A. Overbey—*Macmillan*, 369 p., illus., $9.75. Contains more than 160 tables and 40 figures to illustrate standard methods of equipment installation and maintenance.

BENT'S LIFE HISTORY OF NORTH AMERICAN BIRDS, Vol. I: Water Birds. Vol. II: Land Birds—Henry Hill Collins, Jr., Ed.—*Harper*, 356 p. and 374 p., $5.95 each. Abridgement using full excerpts from Arthur Cleveland Bent's monumental work on the birds of North America.

CAREER 1960 for the Experienced Engineer and Scientist—William H. Ottley, Ed.—*Careers Inc.*, 109 p., illus., paper, $1.95. Leading national employers highlight their job opportunities for experienced men.

CATES' PRIMARY ANATOMY—J. V. Basmajian—*Williams & Wilkins*, 4th ed., 360 p., illus., $6.50. Textbook at university level.

CLASSICAL MATHEMATICS: A Concise History of the Classical Era in Mathematics—Joseph Ehrenfried Hofmann, transl. from German by H. O. Midonick—*Philosophical Lib.*, 159 p., $4.75. Covers 17th and 18th centuries.

THE EVERGREENS—James H. Beale—*Doubleday*, 285 p., photographs, $4.50. Practical introduction to evergreen trees and shrubs, their characteristics, hardiness and care.

FEDERAL SUPPORT FOR EDUCATION: The Situation Today—F. J. Seidner—*Public Affairs Institute*, 22 p., paper, 15¢ direct to publisher, 312 Penna Ave., S.E., Washington 3, D.C. Summary of essential figures and legislative background.

THE FIRST FIVE FATHOMS: A Guide to Underwater Adventure—Arthur C. Clarke, introd. by Captain Jacques-Yves Cousteau—*Harper*, 83 p., photographs by Mike Wilson, $2.75. Shows skin divers at work.

FLUID MECHANICS—L. D. Landau and E. M. Lefshitz, transl. from Russian by J. B. Sykes and W. H. Reid—*Pergamon (Addison-Wesley)*, 536 p., $14.50. Describes fluid mechanics as a branch of theoretical physics.

FOODS WITHOUT FADS: A Common Sense Guide to Nutrition—E. W. McHenry—*Lippincott*, 159 p., $3.50. Information for the general reader.

GATEWAY TO SPACE—Charles Coombs—*Morrow*, 256 p., illus., $3.95. The story of U. S. space projects told for young people.

HENRY FORD: Boy with Ideas—Hazel B. Aird and Catherine Ruddiman—*Bobbs*, 192 p., illus. by Wallace Wood, $1.95. Childhood biography for youngest readers.

INDUSTRIAL PACKAGING—Walter F. Friedman and Jerome J. Kipnees—*Wiley*, 536 p., illus., $11.50. Up-to-date survey of packaging materials, methods and equipment.

AN INTRODUCTION TO MODERN MATHEMATICS—Robert W. Sloan—*Prentice-Hall*, 73 p., $3.75. Develops elementary mathematics from a modern point of view, to serve as reference for high school mathematics teachers.

KARIBA: The Struggle with the River God—Frank Clements—*Putnam*, 223 p., photographs, map, $3.95. Story of construction of the Kariba Dam in Central Africa, where engineers had to overcome the obstacles of primitive superstition.

THE LAST BLUE MOUNTAIN—Ralph Barker, foreword by Sir John Hunt—*Doubleday*, 210 p., photographs, maps, $3.95. The struggle for survival of ill-fated expedition to the Himalayas in 1957.

MAJOR ACTIVITIES IN THE ATOMIC ENERGY PROGRAMS, January-December 1959—U. S. Atomic Energy Commission—*GPO*, 628 p., illus., paper, $2. AEC's annual report on the atomic energy industry, nuclear research, and management of radioactive wastes.

MARINE BORING AND FOULING ORGANISMS—Dixy Lee Ray, Ed.—*Univ. of Wash. Press*, 543 p., illus., $8.50. Proceedings of 1957 Friday Harbor Symposium, concerned with the basic biology of limnoria, terediniens and barnacles, and re-examination of present control methods.

MODERN NUTRITION IN HEALTH AND DISEASE: Dietotherapy—Michael G. Wohl and Robert S. Goodhart, Eds.—*Lea*, 2nd ed., 1152 p., illus., $18.50. New sections on chemical and other food additives, and on dietary factors in atherosclerosis and coronary artery disease.

MOLECULAR BIOLOGY: Elementary Processes of Nerve Conduction and Muscle Contraction—David Nachmansohn, Ed.—*Academic*, 177 p., illus., $7.50. Symposium held at the Rockefeller Institute in 1958.

THE POPULATION EXPLOSION AND CHRISTIAN RESPONSIBILITY — Richard M. Fagley — *Oxford Univ. Press*, 260 p., $4.25. Analysis from a Congregational minister's perspective of the problems posed by an uncontrolled birth rate, particularly in the underdeveloped areas of Asia, Africa and Latin America.

PRINCIPLES AND PROCEDURES FOR EVALUATING THE SAFETY OF FOOD ADDITIVES—Food Protection Committee—*Nat. Acad. of Sciences-Nat. Res. Council*, 9 p., paper, single copies free upon request direct to publisher, 2101 Constitution Ave., Washington, D. C. Revised by Subcommittee on Toxicology.

PROBLEMS IN THE EVALUATION OF CARCINOGENIC HAZARD FROM USE OF FOOD ADDITIVES—Food Protection Committee, Food and Nutrition Board—*Nat. Acad. of Sciences-Nat. Res. Council*, 44 p., paper, $1. Review of available information prepared by Subcommittee on Carcinogenesis.

PUBLIC HEALTH—Peter Van Avery, Ed.—*Wilson, H. W.*, 242 p., $2.50. Collection of popularly written articles about the work and organization of public health.

RIVERS IN THE DESERT: A History of the Negev—Nelson Glueck—*Grove*, 303 p., illus., paper, $2.95. Reprint of 1959 edition.

SCIENCE EXPERIMENTS for Every Boy and Girl—Louis W. Kleinman—*Hart*, 192 p., illus. by J. Pearson, paper, $1. Simple experiments with air, heat, electricity, water, light, and sound.

SCIENCE, SCIENCE, EVERYWHERE—Ruth Cromer Weir—*Abingdon*, 47 p., illus. by Gloria Stevens, $2. Story for youngest readers.

SIMILARITY AND DIMENSIONAL METHODS IN MECHANICS—L. I. Sedov, transl. from Russian by Morris Friedman, Maurice Holt, Ed.—*Academic*, 363 p., $14. Complete development of the fundamental concepts of dimensional analysis and similarity methods.

THE STRUCTURE OF SCIENTIFIC THOUGHT: An Introduction to Philosophy of Science—Edward H. Madden—*Houghton*, 381 p., $5. Essays and related selections from literature of science.

TEXTBOOKS IN PRINT 1960, formerly The American Educational Catalog—Office of Publishers' Weekly—*Bowker*, rev. ed., 131 p., title and author index, paper, $2. Elementary and secondary school books classified by subject.

TREASURES UNDERGROUND—Brian Mason—*Home Lib. Press*, 32 p., illus. by R. F. Peterson, 69¢; de luxe ed., $1.95. Introduction to minerals and metals, for children.

TUKANI—Helmut Sick, transl. from German by R. H. Stevens—*Eriksson-Taplinger*, 240 p., photographs, $5. Naturalist's story of seven-year expedition into the wilderness of Central Brazil.

UNDER A GREEN ROOF: Animals and Birds of Our Woods—Anne Marie Jauss—*Lippincott*, 64 p., illus. by author, $2.95. Accurate and charming introduction to the wildlife in and under trees, north and south, west and east.

THE WALLS OF WINDY TROY: A Biography of Heinrich Schliemann—Marjorie Braymer—*Harcourt*, 189 p., photographs, $3.50. Biography for young people.

WEATHER AND CLIMATE—Julius London—*Home Lib. Press*, 34 p., illus. by George Geygan, 69¢; de luxe ed. $1.95. Introduction to meteorology for boys and girls.

WHAT DOES A CIVIL ENGINEER DO?—Robert Wells—*Dodd*, 64 p., photographs, $2.50. Word and picture story of engineering projects.

WHEN CHILDREN MOVE FROM SCHOOL TO SCHOOL—Bess B. Lane and others—*Assn. for Childhood Educ.*, 36 p., paper, 75¢. How to help the child face changes from known to unknown neighborhood, school and community.

THE WONDER OF LIGHT: A Picture Story of How and Why We See—Hy Ruchlis—*Harper*, 154 p., illus. by Alice Hirsh, photographs, $2.95. In simple language and diagrams the author explains how light behaves, the different kinds of light and optics. Includes problems.

WORK AND THE HEART—Francis F. Rosenbaum and Elston L. Belknap, Eds.—*Hoeber*, 537 p., illus., $12. Transactions of the First Wisconsin Conference on Work and the Heart. 74 experts deal with the influences of work, exercise and stress on cardiac function.

YOUR HEART: A Handbook for Laymen—H. M. Marvin—*Doubleday*, 335 p., $4.50. Written by a past president of the American Heart Association.

YOUTH LOOKS AT CANCER: An Informative Text for Secondary School Students—Westchester Cancer Committee—*American Cancer Society*, 68 p., illus., paper, free upon request direct to publisher, 521 W. 57th Street, New York 19, N. Y.

Questions

ASTRONOMY—What date is the Comet Burnham expected to get closest to the North Star? p. 179.

ENTOMOLOGY—What is the name of the first female centipede of its kind ever recorded? pp. 181 and 189.

ORNITHOLOGY—A factor that may alleviate the drought which is causing decrease in the duck population on the Pacific Coast is? p. 184.

SURGERY—Which method was used successfully in surgery after the patient's heart had stopped? p. 180.

Photographs: **Cover, Westinghouse Electric Corporation; p. 179, U. S. Navy; p. 181, Fremont Davis; p. 183, project pictures by Westinghouse Electric Corporation, group pictures by Fremont Davis; p. 186, Fremont Davis; p. 192, W. R. Grace and Co.**

Youth Explores Science

(Continued from p. 181)

laboratory work, observing and recording in detail 20 different habitats and collecting some 500 specimens. Last summer while working with the Entomology Department of the State Plant Board of Florida, in conjunction with the National Science Foundation Summer Research Program, Bill collected one of the first recorded specimens of the female centipede, *N.xenopus* (Bollman).

This specimen and others have been given to the Smithsonian Institution in Washington, D. C., at the request of Dr. Ralph E. Crabill Jr., who has identified many of Bill's centipede specimens for him. Reports of their research helped these boys to become two of the 40 winners of the Science Talent Search.

Spook Light, Space Fuel

LAST SUMMER a 17-year-old Carthage, Mo., scientist traveled 12 miles southwest of Joplin, Mo., to a lonely northeastern Oklahoma road to chase a ghost. He solved the mystery of the famous Hornet "Spook Light" which had baffled other investigators for years.

As young William E. Underwood described his experience: "Soon after dusk a suffused glow appeared in the sky to the west over a range of hills, the center of the lighted area being in line with the axis of the road. The greenish-yellow ball appeared to descend out of the hills and rapidly advance toward us."

Continued observing sessions showed that the Spook Light varied in intensity and in the time of its appearance, and that it sometimes became duplex. A less frequent and weirdly dramatic effect was produced when the light approached and seemed to envelop him where he stood.

When he looked at the Light through a spectrotelescope, it had a continuous spectrum, so William deduced that it must have an incandescent source. When he took infrared films of the Spook, he became convinced that it was produced by total reflection of automobile headlights.

The physical features of the Spooky area further supported his theory, for U. S. Route 66, east and west, was in direct line with his observation point and Spring River crossed close by between the gravel road and the highway. Thus William concluded that the Spook was nothing more or less than the light of car headlamps reflected over the range of low-lying hills.

Another 17-year-old scientist, of Houston, Texas, hopes to discover new information about a fuel that may propel missiles, space ships and helicopter rotors of the future.

Because this fuel, 98% hydrogen peroxide, has had important use in compact, simple rocket engines, William L. R. Cruce, senior at Spring Branch Senior High School, Houston, Texas, has embarked on an extensive testing program aimed at more complete understanding of the effects of catalysts on the rate and efficiency of its decomposition. His report of his work and projected tests contributed to his being named one of the top 40 winners of the 19th Science Talent Search.

At the University of Texas Mechanical Engineering Propulsion Laboratory, Bill has nearly completed construction of a two-dimensional transparent chamber rocket engine which he designed as a test device.

The 40 winners went to the Science Talent Institute in Washington, D. C., March 3 through 7. During the Institute, the 31 boys and nine girls met eminent scientists, visited laboratories of unusual interest, and were interviewed by a panel of judges for the awarding of $34,250 in Westinghouse Science Scholarships and Awards.

Science News Letter, March 19, 1960

Do You Know

Nearly five billion pounds of *poultry* and poultry products were certified as wholesome and healthful food during 1959, the first year of full operation for the Poultry Products Inspection Act.

The Bureau of Land Management of the Department of Interior is responsible for the conservation, management and development of more than 477,000,000 acres of the nation's *public lands*.

In order to thrive, *pearl* oysters require calm surface waters, a fairly constant mild temperature, and abundant plankton on which to feed.

More than 40,000,000 tons of chemical materials are required for each year's domestic *agricultural production*.

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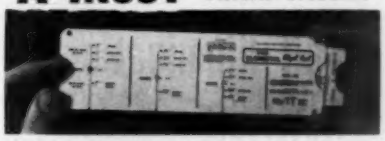

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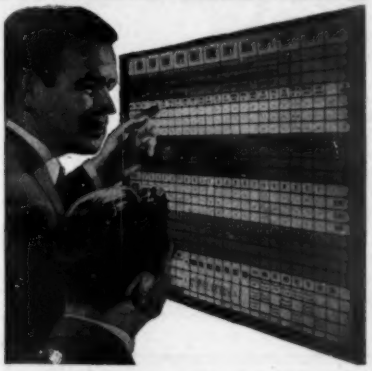

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BACTERIOLOGY

Ultraviolet Radiation Knocks Out Staphylococci

THE USE of ultraviolet radiation appears capable of keeping antibiotic-resistant staphylococci on the run in hospital operating rooms.

This method, which kills bacteria in the air, has been in use at Duke Hospital, Durham, N. C., for more than 20 years in as many as 15 operating rooms. The results have been nothing short of miraculous, Dr. Deryl Hart, professor of surgery at Duke University School of Medicine, reports in the Journal of the American Medical Association, 172:1019, 1960.

Keeping pathogenic bacteria out of a clean wound is preferable to trying to control their growth or to kill them after they enter. With the present widespread distribution of antibiotic-resistant staphylococci, prevention of such contamination is now all the more important, he explains.

In the Duke Hospital, so-called unexplained infections in clean operative wounds have been both explained and eliminated, to a great extent, by a variety of measures aimed at limiting the contamination of the air with pathogenic bacteria. Also, the use of ultraviolet radiation kills the remaining bacteria that inevitably get into the air, and, by sedimentation, onto exposed surfaces.

Dr. Hart reports he believes that most bacteria spread through the air and this is responsible for most of the so-called unexplained infections in clean operative wounds. Destroying bacteria floating in the air obviously offers protection regardless of the source of the bacteria.

A study revealed that air contamination rose rapidly in a bacteria-free operating room when it was occupied. Staphylococci were the main offenders and were directly related to the number of persons in the room, how long they remained, and the time of year. Winter is the worst season.

Both patient and hospital personnel can easily be protected from the rays, he stresses. Nurses and doctors wear eye shades and glasses. Patient's eyes are usually closed. The skin is covered or shaded during frequent or long periods of exposure.

Science News Letter, March 19, 1960

ASTRONOMY

Canadian Scientist Shows How Earth Is Expanding

A CANADIAN scientist has figured out how the earth could be expanding—a conclusion reached independently by at least two scientists in the last two years.

Dr. A. E. Beck of the University of Western Ontario's department of geophysics, London, Ontario, reports that an expansion of the earth's diameter of about 62 miles is "quite possible" even if there are no external or internal sources of energy. The expansion would result from the earth's continual attempt to proceed from a higher state of potential energy to a lower state, Dr. Beck stated in Nature, 185:677, 1960.

Science News Letter, March 19, 1960

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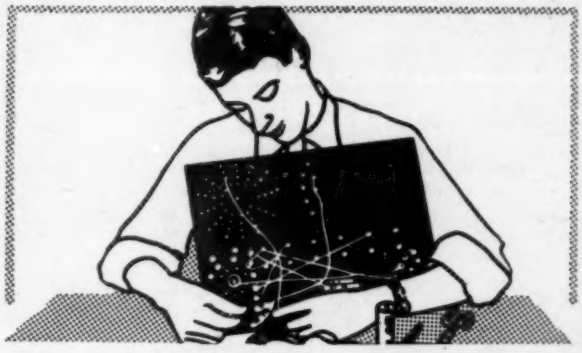

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WATER-THINNED OUTDOOR PAINT is said to resist blistering and peeling because it has a porous film that permits air to "breathe through." Thus it may be applied in damp weather and will dry within two hours. It has an acrylic latex base and is available in 15 colors, each with a low sheen finish.

Science News Letter, March 19, 1960

GARAGE DOOR ORNAMENTS of butyrate plastic can be screwed on to garage doors for a decorative accent. The ornamental moldings come in a variety of designs, including lattices, shutters, decorative scrolls. Supplied in white, they may be painted to match different color schemes.

Science News Letter, March 19, 1960

MICROFILM SPLICER permits businesses to revise, repair or consolidate their 16 mm microfilm records. Featuring clear tape, the unit does not require the operator to touch the face of the film.

Science News Letter, March 19, 1960

REINFORCED SUCTION HOSE for industrial use is strong and sturdy because the rubber core of the hose is surrounded by a coil of high density polyethylene. Both core and coil are wrapped with an outside layer of abrasion-resistant rubber. The hose,

seen in the photograph, is constructed to rebound to full diameter even after being run over by a heavy dump truck.

Science News Letter, March 19, 1960

MILITARY GAME for adults is a test of strategy played on a 1914 map of Europe. Three to seven may play. Each represents one of the great powers of Europe. There are no dice involved. Players plan moves, write them on a pad and all expose them at same time, thereby realigning armies and fleets, represented by the playing pieces. A game of admitted skulduggery, players may gang up in shrewd alliances.

Science News Letter, March 19, 1960

FISH SPOTTER-DEPTH SOUNDER is a portable electronic device for use on rowboats and yachts. Housed in a plastic case, the compact unit takes power from lantern batteries or a 12-volt external D.C. source, and has a "triple bright" neon scope indicator. It will measure depths up to 160 feet.

Science News Letter, March 19, 1960

SOUND FILMSTRIP PROJECTOR for presentations before an individual or small group is a compact 10½-pound sales or training aid. The projector and two-speed phonograph are packed into a carrying case 14 x 14 x 7 inches. The lid forms a shadow box screen.

Science News Letter, March 19, 1960

ELECTRONIC ALARM SYSTEM rings out as soon as an intruder goes near protected equipment. The alarm may also be adjusted to ring only when the protected equipment is touched. The warning system may be connected through leased wire to a police station.

Science News Letter, March 19, 1960

Nature Ramblings

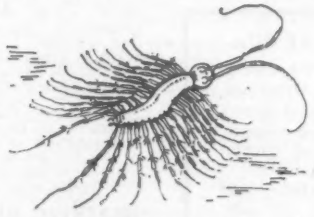
By HORACE LOFTIN

Hundreds and Thousands of Legs

HAVE YOU EVER checked on the fellow who first said that a thousand-legs has a thousand legs? Or even the one who claimed that a hundred-legs has a hundred legs?

Neither have I. But the experts have bothered to check, at least on the centipede (hundred-legs). According to their tally, some have up to 173 pairs of legs while other limp around with only 15 pairs. On the average, though, 35 pairs—or 70 individual legs—seems to be the most usual number. So between the big ones and the little ones, it appears that the centipede is accurately named.

As for the millipedes (thousand-legs or pillbugs), absolute counts seem hard to come by. It does appear that 1,000 is a gross exaggeration for the number of appendages on this creature. On the other hand, the millipede does deserve recognition for the fact that it has two legs for every one the centipede can boast of.



Whereas the centipede has a single pair of legs for each segment of his worm-like body, the millipede has two—and this is the best way to distinguish between them.

There is more than academic interest in knowing how to tell centipedes from millipedes. Centipedes possess poison glands which open through claws in the first pair of legs; millipedes are perfectly harmless.

Now, the common little house centipede of the United States is not to be "viewed with alarm" because of his bit of poison. It is such a little bit that this creature could hardly harm even a baby—if he could be induced to bite.

On the other hand, he does us service as a militant enemy of cockroaches, silverfish and other household pests. Some of the centipedes of the tropics, however, can inflict a terrible bite. Among the tropical species, some attain a length of one foot and have a body as thick around as your thumb.

The millipedes are plant eaters, in contrast to the voracious centipedes which prey on worms, insects and the like. The smaller ones double up into a little ball to hide their vulnerable legs when they are molested, looking for all in the world like a pill. Hence their common name, pillbug. The larger millipedes coil up like the spring of a watch when you poke them. A good-sized millipede scurrying on his double set of legs is a rather awesome sight if you are not aware of his gentle nature.

And as you gaze at him, you cannot help wondering what would happen if he stopped to think what leg he should put down next!

Science News Letter, March 19, 1960